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# Research and Development based on Interactive Computer Aided Instruction Software

Hongtao Cai, Yanhong Wang, Yusheng Li

*Shenyang Medical College, Basic Department of Computer and Mathematics & Physics, Shenyang, Liaoning, 110034, China*

**Abstract**

At present, the computer aided instruction software in modern education process has been popularized, teachers usually adopt multimedia educational software for teaching, however, due to their limited ability in making courseware, the teaching contents can't be flexibly demonstrated. The interactive CAI software can demonstrate the arranged teaching contents naturally and rationally, fully mobilize students' enthusiasm in class, and assist teachers to complete the teaching contents. Interactive CAI software is the trend of future development of computer aided instruction. The interactive and design examples of CAI software will be introduced in this paper.

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*Key words:* Interactive; Interactive Mode; Aided Instruction

## 1. Applied Mode of CAI Software

Teachers usually adopt multimedia CAI for teaching, and CAI educational software can convey a lot of teaching contents in unit time during the teaching process. However, due to their limited ability in making courseware, the teaching contents can't be flexibly demonstrated. Teachers often use the Microsoft Powerpoint, and the courseware can only project the texts or images on a large screen, suck kind of teaching method allows a unilateral transmission of the teaching contents, it can neither provide an effective teaching based on students' characteristics nor improve students' enthusiasm in learning, even can't interact with students[1].

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A good CAI software should not only focus on teachers' operation and demonstration, ,.it should be interactive, giving students time and space to think, imagine and understand. Teachers and students can operate and control the whole process, even disrupt the order to arbitrary. Students can fully participate in their study through operation and thinking, drawing efforts to study and research.

## 2. Interactive Mode Design of Educational Software

The teaching practice shows that in the design of CAI software, the sophisticated software architecture, reasonable and correct interactive features can achieve a good result in teaching. The developing tools of interactive courseware used by teachers are Authorware, Flash and so on. Authorware software has a strong interactive feature, which is suitable for the construction of an overall framework of courseware, the interaction in CAI courseware is achieved through its 13 interactive functions. Flash is fit for animations production, and then import the animations into the main program file of Authorware; however, teachers usually use Powerpoint to make courseware that lacks of interactive function, it is more convenient for general explanation courseware such as text editing and static text description and so on [2-3]. In the development process of interactive CAI, the commonly used design methods are interleaving navigation technology, interactive animation design and so on.

### *2.1. Interleaving Navigation Technology*

A lot of knowledge in the curriculum is interrelated and complementary. This requires teachers to connect these knowledge points via a link in an orderly series in the production of CAI courseware, so they can present the teaching contents on the screen according to the requirements during the teaching process. This courseware display is called interleaving navigation, which is generally achieved in the form of hypermedia. Hypermedia is a new multimedia information management technology, which allows you to easily establish a connection between a variety of media information. It is a non - linear network structure, the media information is divided into different information blocks those are called nodes, and different nodes are connected to form a network according to their associated link. Hypermedia collects, stores and browses the discrete information and then establish the relationship between them with this method. It has changed the linear learning structure of traditional text materials, and can teach students at various levels according to their individual innate abilities.

Interleaving navigation technology requires teachers to have a strong ability to control the teaching contents, according to students' course study, teachers can timely adjustment the teaching progress, intersperse with some pre-designed teaching contents. Using the framework and navigation icons can set the page turning structure, and solve the disorientation problems in individual learning. For example, in the CAI production of "VFP Programming Design" that based on problem mode, as the knowledge in each section is closely related, the navigation icons and interactive icons are used to make a number of hyperlinks in the design, in the teaching process, according to the teaching requirements, teachers can directly move from the current teaching contents to relevant knowledge for supplementary teaching, moreover, after the teaching, they can also return to the previous contents and continue. This way is facilitated for teachers to fully control the teaching rhythm and contents.

### *2.2. Interactive Animation Design*

The using of pictures, videos or animations in case teaching is often more vivid and visualized than simply using a text for the illumination of the problems. In this way, teachers can make presentation through videos

or animations and raise questions, students can positively enter information through thinking, thus properly improving their enthusiasm in learning. For example, in the course of “Cardiac Arrhythmia”, teachers demonstrate the video data of a patient’s ECG spectrum to students, then raise questions and ask students to think, the answers are input by students themselves, and then judged by system, the results are then given based on their answers, followed by the demonstration animation of corresponding results, in addition with the teacher’s comprehensive explanation for this question, the whole process is real and vivid, thus deepening students’ understanding of the questions [4-6].

Such software requires teachers to identify students’ recurring problems on this issue according to their own many years teaching experience during the process of courseware design, and then arrange the teaching contents and collect the materials, finally make a variety of expected results. If class time is limited, students can also learn by themselves after class.

### *2.3. Interactive Screen Scaling Technology in CAI Software*

In the design of CAI software, taking into account the screen’s overall layout, in the design of some of the details, as the current screen contains more teaching contents, some teaching information can be hidden, then complete by setting hot zones or hot objects for corresponding texts in the courseware program. When the mouse is moved to the top of the appropriate location or object, the associated information will pop-up, then teachers can explain the contents by the using of the courseware, after that the pop-up information will disappear. In the condition that not affecting the overall structure of the screen, the display of hidden information is absolutely decided by teachers. If this part of the contents is not required in class, students can review it after class. The main body of this teaching information is always displayed on the screen. This part of teaching is enriched by details changes.

For example, in the course of “Myocardial Diseases”, in order to introduce the clinical manifestations of dilated cardiomyopathy, the course is divided into three stages as the asymptomatic period, symptomatic period and terminal period, the pictures containing the features of these stages are placed side by side in the same display screen, which enables students to contrast the myocardial conditions in different stage. Teachers can set hot objects for these pictures, during the lecture, they only need to click on the pictures to enlarge the entire screen and continue to further explanation. When this question is finished, click the screen to replace this picture, the main points are always displayed in front of students.

### *2.4. Time Limited Interactive Mode*

Sometimes, the design of medical courseware may contain a range of questions rather than one question. If a question requires students to answer in a finite time, we can set interactive time through the software, then the students need to make a quick analysis according to this question, time is counted by the computer, when time is up, different responsible results are given according to the program that students solve the question. This approach is more effective than simple language description by teachers. At the same time, it can improve students' enthusiasm.

For example, in the course of “Emergency Science”, as teachers introduce the matters needed to be handled urgently when doctors are rescuing patients of different symptoms, they need to correctly tell the approach in a certain period of time. When the question is raised, the countdown time will display on the screen with the use of timing icon, if a student can tell the correct approach within the stipulated time, move on to the next question, or the system will give out the correct answer. Generally, such questions are closely interlinked, this kind of practice in class greatly improves students’ interests in learning, and let them have a full understanding of the deficiency of learning knowledge.

### *2.5. Interactive Support of the Educational Software and the Application of OLE Technology*

When use the software that supports OLE technology to develop the educational software, take advantage of the features of software to integrate various functions, OLE technology is an embedded program technology, developers don't need to rewrite the code program. Functions-extended interface can introduce the objects (such as Word text, graphics, digital cinema, etc.) of other applied program design to software. With Authorware's OLE function, ordinary courseware made by Powerpoint can integrate the original PPT to new interactive software without any modification, thus it can simplify the editing of text materials in courseware, and improve its interactivity. In addition, the development platform of Expression Blend 4 + the SketchFlow, WPF and Silverlight can integrate the multi-window interface (including animations, videos, streaming document interfaces) into the desktop or played in IE. They have a function of feedback, and can import PowerPoint files into the screen [7-10].

## 3. Summary

The integration of a lot of interactive contents into the development process of CAI educational software in course teaching can assist teachers to breakthrough the key points and difficulties, and solve some problems difficult to resolve in traditional teaching; And the reasonable use of interaction can fully express the vivid, visualized and non-linear features of multimedia software, create a more lively atmosphere for teaching, improve the efficiency of classroom teaching and stimulate students' interests in learning.

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